

## SYNTHESIS, CHARACTERIZATION AND STABILITY OF SUPERPARAMAGNETIC MAGHEMITE NANOPARTICLE SUSPENSION

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**Abstract:** Maghemite nanoparticles were synthesised using co-precipitation method and characterised by various techniques including XRD, TEM, AGM, DLS, and zeta potential. The stability of the suspension was monitored by measuring the particle size distribution and zeta potential using DLS over a period of a few months. The pattern obtained from XRD confirmed that the particles were maghemite with crystallite size of 9.4 nm. TEM observations and analyses showed that the mean physical size of the nanoparticles was 9.5 nm. The nanoparticles show superparamagnetic behavior with magnetization value at  $\pm 10$  kOe of  $32.18 \text{ emu g}^{-1}$ . The intensity averaged particle size of as-synthesised maghemite nanoparticles was 45.3 nm. The suspension was stored for periods of two, four, and eight months. The intensity averaged sizes were 47.1, 50.5 and 52.1 nm. No sedimentation was observed. The suspension's zeta potential value was 44.6 mV for as-synthesised sample and 43.3, 42.7, and 41.8 mV for sample after storage period of two, four, and eight months, respectively. This indicated that the suspension was very stable.